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30 June 1987
SUPERSEDING
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MILITARY SPECIFICATION

FITTINGS, WIRE REINFORCED HYDRAULIC HOSE AND CLAMP-HALVES, GENERAL SPECIFICATION FOR

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers reusable, field-attachable, hydraulic, 37-degree flare and 4-bolt split-flange hose fittings, and 4-bolt split-flange clamp-halves.

1.2 Classification (see 6.9).

1.2.1 Fittings. Fittings shall be of the following types:

Type 100R1	- For use with 100R1 single wire braid hose.
Type 100R2	- For use with 100R2 double wire braid hose.
Type 100R10	- For use with 100R10 4-spiral-wrap hose.
Type 100RE	- For use with 4-spiral-wrap reinforcement hose.
Type 100R12	- For use with 4-spiral-wrap reinforcement hose.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: USA Belvoir Research, Development, and Engineering Center, ATTN: STRBE-TSE, Fort Belvoir, VA 22060-5606 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 4730

AMSC N/A

1.2.2 Clamp-halves. Clamp-halves shall have the following pressure rating:

3000 psi - MIL-F-52525/16.

1.2.3 Part number. See appropriate specification sheet for military specification on part number.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

QQ-P-416	- Plating, Cadmium (Electrodeposited).

MILITARY

MIL-P-775	- Packaging of Hose, Hose Assemblies: Rubber, Plastic, Fabric, or Metal (Including Tubing); and Fittings, Nozzles, and Strainers.
MIL-L-2104	- Lubricating Oil, Internal Combustion Engine, Tactical Service.
DOD-P-16232	- Phosphate Coating, Heavy, Manganese or Zinc Base (For Ferrous Metals).
MIL-H-52471	- Hose and Hose Assemblies, Rubber: Hydraulic Pressure Type, General Specification For.

(See Supplement 1 for list of associated specification sheets.)

STANDARDS

FEDERAL

FED-STD-H28	- Screw-Thread Standards For Federal Services.

MILITARY

MIL-STD-105	- Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129	- Marking for Shipment and Storage.
MIL-STD-889	- Dissimilar Metals.
MS 39267	- Hose, Rubber: Hydraulic, Pressure Type, Minimum Bend Radius.

(Copies of specifications and standards required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DoDISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS shall be the issue of the non-Government documents which is current on the date of the solicitation.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

B46.1 - Surface Texture (Surface Roughness, Waviness, and Lay).

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

B 633 - Electrodeposited Coatings of Zinc on Iron and Steel.
D 3951 - Standard Practice for Commercial Packaging.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE Handbook.

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15086.)

(Non-Government standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, (except for specification sheets or MS standard), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein, and in accordance with the applicable specification sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

3.1.1 Description. Fittings listed in table I through V shall be compatible with hose conforming to MIL-H-52471 and shall conform to the military specification sheets and military standards (MS's), as applicable, and shall be as specified herein. In the event of any conflict between requirements of this specification and the specification sheet or MS, the latter shall govern.

Applicable specification sheet	Nominal size range (inch)	Termination	Style	Configuration
MIL-F-52525/5	1/4 thru 1-1/4	37° Flare	Screw-on	Straight
MIL-F-52525/6	1/4 thru 1	37° Flare	Screw-on	45° bent tube
MIL-F-52525/7	1/4 thru 1	37° Flare	Screw-on	90° bent tube short drop
MIL-F-52525/8	1/4 thru 1	37° Flare	Screw-on	90° bent tube long drop

TABLE II. Type 100R2 fittings (for 100R2 double wire braid hose).

Applicable specification sheet	Nominal size range (inch)	Termination	Style	Configuration
MIL-F-52525/1	1/4 thru 2	37° Flare	Screw-on	Straight
MIL-F-52525/2	1/4 thru 1	37° Flare	Screw-on	45° bent tube
MIL-F-52525/3	1/4 thru 1	37° Flare	Screw-on	90° bent tube short drop
MIL-F-52525/4	1/4 thru 1	37° Flare	Screw-on	90° bent tube long drop
MIL-F-52525/10	1/2 thru 2	4-bolt split-flange	Screw-on	Straight
MIL-F-52525/11	1/2 thru 2	4-bolt split-flange	Screw-on	45° bent tube
MIL-F-52525/12	1/2 thru 2	4-bolt split-flange	Screw-on	90° bent tube

TABLE III. Type 100R10 fittings (for 100R10 4-wire spiral hose).

Applicable specification sheet	Nominal size range (inch)	Termination	Style	Configuration
MIL-F-52525/9	3/4 thru 1-1/2	37° Flange	Screw-on	Straight
MIL-F-52525/13	3/4 thru 1-1/2	4-bolt split-flange	Screw-on	Straight
MIL-F-52525/14	3/4 thru 1-1/2	4-bolt split-flange	Screw-on	45° bent tube
MIL-F-52525/15	3/4 thru 1-1/2	4-bolt split-flange	Screw-on	90° bent tube
MIL-F-52525/23	1 thru 2	4-bolt split-flange	Clamp-on	Straight
MIL-F-52525/24	1 thru 2	4-bolt split-flange	Clamp-on	45° bent tube
MIL-F-52525/25	1 thru 2	4-bolt split-flange	Clamp-on	90° bent tube short drop

TABLE IV. Type 100RE fittings (for 100RE 4-spiral-wrap reinforcement hose).

Applicable specification sheet	Nominal size range (inch)	Termination	Style	Configuration
MIL-F-52525/31	3/4 and 1	37° Flare	Screw-on	Straight
MIL-F-52525/32	3/4 and 1	37° Flare	Screw-on	45° bent tube
MIL-F-52525/33	3/4 and 1	37° Flare	Screw-on	90° bent tube
MIL-F-52525/34	3/4 and 1	4-bolt split-flange	Screw-on	Straight
MIL-F-52525/35	3/4 and 1	4-bolt split-flange	Screw-on	45° bent tube
MIL-F-52525/36	3/4 and 1	4-bolt split-flange	Screw-on	90° bent tube

TABLE V. Type 100R12 fittings (for 100R12 4-spiral-wrap reinforcement hose).

Applicable specification sheet	Nominal size range (inch)	Termination	Style	Configuration
MIL-F-52525/37	3/4 and 1	37° Flare	Screw-on	Straight
MIL-F-52525/38	3/4 and 1	37° Flare	Screw-on	45° bent tube
MIL-F-52525/39	3/4 and 1	37° Flare	Screw-on	90° bent tube
MIL-F-52525/40	3/4 and 1	4-bolt split-flange	Screw-on	Straight
MIL-F-52525/41	3/4 and 1	4-bolt split-flange	Screw-on	45° bent tube
MIL-F-52525/42	3/4 and 1	4-bolt split-flange	Screw-on	90° bent tube

3.2 Qualification. Fittings furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable qualified products list at the time set for opening of bids (see 4.3 and 6.3).

3.3 Material. Material shall be steel or malleable iron. Silver solder shall not be used; however, welding or brazing will be permitted.

3.3.1 Material deterioration prevention and control. The fittings shall be fabricated from compatible materials, inherently corrosion resistant or treated to provide protection against the various forms of corrosion and deterioration that may be encountered in any of the applicable operating and storage environments to which the fittings may be exposed.

3.3.1.1 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion. Dissimilar metals and methods of protection are defined and detailed in MIL-STD-889.

3.3.1.2 Identification of materials and finishes. The contractor shall identify the specific material, material finish or treatment for use with component and sub-component, and shall make information available upon request to the contracting officer or designated representative.

3.3.2 Recovered materials. For the purpose of this requirement, recovered materials are those materials which have been collected from solid waste and reprocessed to become a source of raw materials, as distinguished from virgin raw materials. The components, pieces and parts incorporated in the fittings may be newly fabricated from recovered materials to the maximum extent practicable, provided the fittings produced meets all other requirements of this specification. Used, rebuilt or remanufactured components, pieces and parts shall not be incorporated in the fittings.

3.4 Threaded parts. All screw threads shall be in accordance with FED-STD-H28, except threads that grip the hose, if used, are optional.

3.5 Environmental conditions.

3.5.1 Low temperature. The fittings, while attached to the hose and while at a temperature of -40 °F (-40 °C), shall withstand the force required to bend the hose to its minimum bend radius within not less than 8 nor more than 12 seconds without evidence of leakage, rupture, slippage, or detachment (see 6.6 and 4.5.2.3).

3.6 Reusability. The fittings shall withstand two cycles of assembly to hose, proof pressure, and disassembly without evidence of leakage, rupture, detachment, or deformation that prevents disassembly and reassembly. The fittings shall meet all provisions of this specification when assembled to a third length of hose.

3.7 Overtightening torque. The 37-degree flare-style fittings shall withstand 15 applications of overtightening torque of the swivel nut to the value shown on the applicable specification sheet without distortion that prevents freely turning the swivel nut by hand, without stripping the thread, and without damage to 37-degree flare seat that prevents sealing (see 4.5.2.4).

3.8 Split-flange fittings. Split-flange fittings shall be furnished with clamp-halves conforming to MIL-F-52525/16, and capscrews, lockwashers, and O-rings as specified in MIL-F-52525/17.

3.8.1 Flange head. The flange head for 4-bolt split-flange fittings shall conform to SAE J518, standard series.

3.9 Clamp-halves. Four-bolt split-flange clamp-halves shall be furnished in pairs.

3.10 Impulse. The fittings, while attached to the hose and after subjection to a temperature of 212 °F (100 °C) for 24 hours, shall withstand an impulse pressure for the number of impulse cycles specified in table VI without evidence of leakage, rupture, detachment, slippage, or deformation that prevents disassembly or reassembly when tested (see 4.5.2.7 and 6.6).

TABLE VI. Impulse cycles.

Type of fitting	Number of impulse cycles
100R1	150,000
100R2	150,000
100R10	300,000
100RE	500,000
100R12	500,000

3.10.1 Clamp-halves. Clamp-halves shall withstand 300,000 impulse cycles without evidence of leakage, rupture, detachment, or deformation.

3.11 Proof pressure. The fittings, while attached to hose, shall withstand a pressure equal to twice the maximum operating pressure listed on the applicable specification sheet without evidence of leakage, slippage, rupture, deformation, or detachment from the hose (see 4.5.2.5 and 6.6).

3.12 Burst pressure. The fittings, while attached to hose, shall withstand a pressure equal to four times the maximum operating pressure required by the applicable specification sheet without evidence of leakage, rupture, or detachment from the hose (see 4.5.2.6 and 6.6).

3.12.1 Burst pressure for clamp-halves. Clamp-halves shall withstand the applicable burst pressure specified in MIL-F-52525/16 without evidence of leakage, rupture, detachment, or deformation (see 4.5.2.6.1).

3.13 Finish. The fittings shall be zinc plated in accordance with ASTM B 633, type II, Fe/Zn 13; cadmium plated in accordance with QQ-P-416, type II, class 3 (except the embrittlement test need not be run); or phosphate coated in accordance with DOD-P-16232, type Z, class 1.

3.14 Marking. The marking shall conform to, but shall not be limited to, the marking required by the applicable specification sheet. The marking shall be applied directly to a visible surface of the assembled fitting by metal stamping, forging, casting, or molding. The marking may be applied in any order. Location of marking shall minimize the possibility of removal or defacement of part identification by normal wear (see 6.5).

3.15 Instruction sheet. Each fitting shall be accompanied by an instruction sheet. The instruction sheet shall detail hose end preparation, assembly to and disassembly from hose and mating fittings, and required torques. When 4-bolt split-flange clamp-halves are furnished, the instruction sheet shall include the information required to attach the clamp-half to a port face.

3.16 Tools. The fittings shall couple to and uncouple from the hose and shall assemble to and disassemble from mating fittings and surfaces without special tools.

3.17 Workmanship. Machined surfaces of fittings and clamp-halves shall be free of burrs and longitudinal tool marks. Unless a finer finish is specified on the applicable specification sheet, sealing surfaces shall be smooth, except that annular toolmarks up to 100 microinches (.000254 micrometers [µm]) roughness-height-rating (rhr) as defined in ANSI B46.1 will be acceptable. All other machined surfaces shall not exceed 250 microinches (.000635 micrometers [µm]) rhr. Unmachined surfaces, such as forging surfaces and bar stock flats, shall be free of cracks, laps, and seams. Weld and braze joints shall be free of pits, blisters, slivers, and laminations.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Component and material inspection. The contractor is responsible for insuring that components and materials used are manufactured, examined, and tested in accordance with referenced specifications and standards, as applicable.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. Qualification inspection (see 4.3).
b. Quality conformance inspection (see 4.4).
c. Inspection of packaging (see 4.6).

4.3 Qualification inspection.

4.3.1 Examination. The hose fittings and 4-bolt split-flange clamp-halves shall be examined as specified in 4.5.1. Presence of one or more defects shall be cause for rejection.

4.3.2 Tests.

4.3.2.1 Fittings and clamp-halves. Fittings and 4-bolt split-flange clamp-halves shall be tested as specified in table VII in the order shown. Failure of any test shall be cause for rejection (see 6.3).

TABLE VII. Inspection schedule.

SCHEDULE		Designation	Test paragraph	Requirement paragraph	No. of specimens per qualified hose
Test No.	Sequence				
1	1	Reusability	4.5.2.2	3.6	4 fittings
	2	Low temperature	4.5.2.3	3.5.1	
	3 1/	Proof pressure	4.5.2.5	3.11	
2 1/	1	Reusability	4.5.2.2	3.6	4 fittings
	2 1/	Burst pressure	4.5.2.6 and 4.5.2.6.1 2/	3.12	
3	1	Reusability	4.5.2.2	3.6	4 fittings
	2	Impulse	4.5.2.7	3.10	
4 3/	1	Over-tightening torque	4.5.2.4	3.7	4 fittings
	2	Proof pressure	4.5.2.5	3.11	

1/ The burst pressure test may be performed on the low temperature specimens instead of the proof test, in which case separate burst test specimens will not be required and test No. 2 need not be run.
2/ Applicable when fittings with attached parts are being qualified.
3/ Applicable when 37-degree flare fittings are to be supplied.

4.3.2.2 Clamp-halves, 4-halves, 4-bolt split-flange. When only 4-bolt split-flange clamp-halves are to be qualified, four clamp-halves shall be tested as specified in 4.5.2.6.1 and an additional four clamp-halves shall be tested as specified in 4.5.2.7.1. Failure of any test shall be cause for rejection.

4.4 Quality conformance inspection.

4.4.1 Unit of product.

4.4.1.1 Fittings. One fitting with two clamp-halves (when applicable) shall be one unit of product.

4.4.1.2 Clamp-halves. When clamp-halves are furnished separately (without fitting), two clamp-halves (a pair) shall be one unit of product.

4.4.2 Lot. A lot shall consist of not more than 1000 units of product of the same size, type, style, and configuration, as applicable.

4.4.3 Sampling.

4.4.3.1 For examination. Sampling for examination shall be in accordance with MIL-STD-105.

4.4.3.2 For tests (see 6.8). Sampling for tests shall be in accordance with MIL-STD-105, inspection level S-2, except that when a fitting sample size is not a multiple of two, additional fittings, sufficient in number to make the sample size a multiple of two, shall be selected at random from the lot. When a fitting terminates in a 4-bolt split-flange head, each fitting shall be accompanied by clamp-halves, capscrews, lockwashers, and an O-ring in accordance with MIL-F-52525/17.

4.4.4 Examination. Samples selected in accordance with 4.4.3.1 shall be examined in accordance with 4.5.1. AQL shall be 1.0 percent defective.

4.4.5 Tests (see 6.8).

4.4.5.1 Fittings. Fittings selected in accordance with 4.4.3.2 shall be assembled to hose and tested as specified in 4.5.2.5. AQL shall be 1.0 percent defective.

4.5 Inspection procedure.

4.5.1 Examination. The fittings and clamp-halves shall be examined as specified herein for the following major defects:

101. Materials not as specified.
102. Materials are not resistant to corrosion and deterioration or treated to be resistant to corrosion and deterioration for the applicable storage and operating environments.
103. Dissimilar metals as defined in MIL-STD-889 are not effectively insulated from each other.

104. Contractor does not have documentation available for identification of material, material finishes or treatment.
105. Used, rebuilt or remanufactured components, pieces, or parts incorporated in the fittings.
106. Threads not as specified.
107. Dimensions not in accordance with the applicable specification sheet.
108. Silver solder used in fabrication.
109. Type, size, termination, style, or configuration not in conformance with the applicable specification sheet.
110. Flange head not as specified.
111. O-ring, capscrews, or lockwashers missing or not as specified.
112. Clamp halves not furnished in pairs.
113. Finish not as specified.
114. Marking missing, illegible, or not as specified.
115. Instruction sheets not complete or missing.
116. Special tools required.
117. Workmanship not as specified.

4.5.2 Tests.

4.5.2.1 Test assembly preparation. Test specimens (hose assemblies) shall be assembled in accordance with the fitting manufacturer's instruction sheet. Test specimens for qualified products listing testing shall be marked with white ink, on the hose, at the skirt of the fitting. Unless otherwise specified herein, the free length of hose measured between fittings shall be determined as follows:

$$\text{90-degree bend hose free length} = \frac{\pi r}{2} + 2D$$

$$\text{180-degree bend hose free length} = \pi + 2D$$

Where: D = hose outside diameter
r = minimum bend radius specified on MS39267
π = 3.14

4.5.2.2 Reusability. The fittings shall be subjected to the following reusability test:

a. Assemble the fittings to 15-inch (381 mm) lengths of hose.
b. Proof-pressure test these test assemblies in accordance with 4.5.2.5. If there is evidence of leakage, rupture, slippage, or detachment, discontinue the test.
c. Disassemble and examine the fitting, and discard the hose. If there is evidence of permanent deformation that prevents disassembly or reassembly, discontinue the test.

d. Repeat steps a, b, and c, using the same fitting and new 15 inch (381 mm) lengths of hose.
e. Reassemble the same fittings to new lengths of hose in accordance with 4.5.2.1.

After assembly, the fittings shall be subjected to the low temperature and impulse tests as specified in table VII. Evidence of leakage, rupture, detachment, slippage, or permanent deformation that prevents disassembly or reassembly, shall constitute failure of this test.

4.5.2.3 Low temperature. The low temperature test shall be conducted at -40 °F (-40 °C) in accordance with the cold bend test specified in SAE J343 except the uncapped hose or hose assembly shall be preconditioned by immersion in oil conforming to MIL-L-2104, grade 10, for a minimum of 24 hours at a minimum temperature of 212 °F (100 °C). Evidence of splitting or cracking, or inability to pass the proof pressure test specified in 4.5.2.5, shall constitute failure of this test.

4.5.2.4 Overtightening torque. The 37-degree flared-style fitting shall be subjected to the overtightening torque test by assembling to a mating fitting. The threads of the swivel nut of the fitting shall be lubricated with oil conforming to MIL-L-2104, grade 10, prior to this test. The swivel nut of the fitting shall be tightened on the mating fitting to the appropriate overtightening torque value required on the applicable specification sheet and loosened. This sequence shall be repeated 15 times. Evidence of permanent deformation, stripped threads, or failure of the swivel nut to swivel freely by hand after 15 overtightening operations shall constitute failure of this test. Upon completion of this test, the fittings shall be assembled to a 15-inch (381 mm) length of approved hose and proof-pressure tested in accordance with 4.5.2.5 as required in table VII.

4.5.2.5 Proof pressure. The proof pressure test shall be conducted in accordance with SAE J343. The test pressure shall be a pressure that is equal to twice the maximum operating pressure specified in the applicable specification sheet. Evidence of leakage, rupture, or detachment of a fitting shall constitute failure of this test (see 3.2).

4.5.2.6 Burst pressure. The burst pressure test shall be conducted in accordance with SAE J343. The test pressure shall be equal to or greater than four times the maximum operating pressure specified in the applicable specification sheet. Evidence of leakage, rupture, or detachment of a fitting shall constitute failure of this test (see 3.2).

4.5.2.6.1 Clamp-halves, 4-bolt split-flange. When 4-bolt split-flange clamp-halves are required, the clamp-half burst pressure test shall be conducted as follows:

a. Attach a flange-head to the burst pressure machine using two 4-bolt split-flange clamp-halves, an O-ring, four cap-screws, and four lockwashers, and torque to the values specified by the manufacturer's instruction sheet.
b. Apply pressure (through the port face to the flange-head) until failure.
c. Pressure application shall be at a constant rate so as to attain the pressure listed on the applicable specification sheet within a period of not less than 15 seconds and not more than 30 seconds.

Nonconformance to 3.12.1 shall constitute failure of this test.

4.5.2.7 Impulse. The impulse test shall be conducted in accordance with SAE J343 except as specified herein. The uncapped test specimens shall be preconditioned by immersion in oil conforming to MIL-L-2104, grade 10, at a minimum temperature of 212 °F (100 °C) for a minimum of 24 hours. The test pressure shall be in accordance with table VIII. The number of impulse cycles shall be in accordance with table IX. The impulse test oil temperature shall be 200 °F (93 °C). Evidence of leakage, rupture, detachment or slippage of a fitting shall constitute failure of a test specimen. Failure of a test specimen below the minimum number of cycles listed in table IX, or failure of the specimens to attain the average number of impulse cycles listed in table IX shall constitute failure of this test (see 3.10).

TABLE VIII. Impulse test pressure.

Fitting type	Test pressure
100R1	- 125 percent of the maximum operating pressure specified in the applicable specification sheet for hose 1-in. I.D. and smaller and 100 percent for hoses larger than 1-in. I.D.
100R2	- 133 percent of the maximum operating pressure specified in the applicable specification sheet.

TABLE VIII. Impulse test pressure. - Continued

Fitting Type	Test pressure
100R10	- 133 percent of the maximum operating pressure specified in the applicable specification sheet.
100RE	- 133 percent of the maximum operating pressure specified in the applicable specification sheet.
100R12	- 133 percent of the maximum operating pressure specified in the applicable specificaiton sheet.

TABLE IX. Impulse cycles and calculation method.*

Type of fitting	Minimum cycles allowed**	Minimum average	Maximum cycles for computing
100R1	100,000	150,000	200,000
100R2	100,000	150,000	200,000
100R10	225,000	300,000	375,000
100RE	225,000	300,000	375,000
100R12	425,000	500,000	575,000

* Average number of cycles $= \frac{N_1 + N_2 + N_3 + N_4}{4}$

Where:

N_1 = Number of cycles withstood by first test assembly.
N_2 = Number of cycles withstood by second test assembly.
N_3 = Number of cycles withstood by third test assembly.
N_4 = Number of cycles withstood by fourth test assembly.

** Failure of a test assembly below this number shall constitute failure of test.

4.5.2.7.1 Four-bolt split-flange clamp-half. When only 4-bolt split-flange clamp-halves are required, the impulse test shall be conducted as follows:

a. Attach a flange-head to the impulse machine using two 4-bolt split-flange clamp-halves, four capscrews, four lockwashers, and an o-ring, and torque to the values specified by the manufacturer's instruction sheet.
b. Apply 300,000 impulse cycles to the flange-head through the port face.
c. Impulse cycles and impulse wave shape shall be as specified in SAE J343.
d. The impulse oil shall be maintained at 200 °F (93 °C) minimum.
e. Impulse pressure shall be 4000 psi.

Nonconformance to 3.10.1 shall constitute failure of this test.

4.6 Inspection of packaging. The preservation, packing, and marking of the fittings and clamp-halves for level A or level B shall be examined for conformance to the quality assurance provisions of MIL-P-775. The preservation, packing, and marking for commercial shall be examined to determine compliance with ASTM D 3951.

5. PACKAGING

5.1 Preservation. Preservation shall be level A or commercial, as specified (see 6.2).

5.1.1 Level A. Preservation of the fittings and clamp-halves shall be in accordance with the level A preservation-packaging requirements of MIL-P-775.

5.1.2 Commercial. Preservation of the fittings and clamp-halves shall be in accordance with ASTM D 3951.

5.2 Packing. Packing shall be level A, level B, or commercial, as specified (see 6.2).

5.2.1 Level A. Packing shall be in accordance with the level A requirements of MIL-P-775.

5.2.2 Level B. Packing shall be in accordance with the level B requirements of MIL-P-775.

5.2.3 Commercial. Packing shall be in accordance with ASTM D 3951.

5.3 Marking.

5.3.1 Miltary packaging. Marking shall be in accordance with MIL-STD-129.

5.3.2 Commercial packaging. Marking shall be in accordance with ASTM D 3951. In addition the cube and weight shall be marked on the shipping container.

6. NOTES

6.1 Intended use. The fittings and clamp-halves are intended for use in equipment hydraulic systems.

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this specification.

b. Military specification part number required (see applicable specification sheet).

c. Degree of preservation and degree of packing required (see 5.1 and 5.2).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time set for opening of bids, qualified for inclusion in Qualified Products List (QPL No.) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is USA Belvoir Research, Development and Engineering Center, Fort Belvoir, VA 22060-5606, ATTN: STRBE-JCP and information pertaining to qualification of products may be obtained from that activity.

6.4 Bulk hose and reusable fittings. To insure interchangeability of fittings and hose within the supply system, reusable fittings shall be tested with a standard bulk hose of the applicable type and size selected by the qualifying activity.

6.5 Fitting marking. The fitting specification sheet referenced herein (Supplement 1) require that the fittings be marked with the manufacturer's name or trademark, size, and one of the following:

Marking	Indicates use with
R-1	Single-wire-braid hose
R-2	Double-wire-braid hose
R-10	Four-spiral-wrap hose
RE	Four-spiral-wrap reinforcement hose
R-12	Four-spiral-wrap reinforcement hose

6.6 Definitions. For the purpose of this specification, the following definitions apply.

6.6.1 Leakage. Any passage of fluid from the inner portion of the fittings to the outer portion as determined by sight, touch, or pressure loss. Leaks occur through the fitting body, at the junction between the hose and fitting, or at the sealing surface (thread or flange face) of the fitting.

6.6.2 Rupture. A leak which causes visible damage to the fitting or hose adjacent to the fitting as evidenced by the rapid loss of volume of the pressurizing agent, or sharp reduction in pressure.

6.6.3 Detachment. The loss or partial loss of contact between the fitting and the hose to which it is attached or the loss or partial loss of contact between the fitting and a test fixture fitting by virtue of thread stripping or severance of a fitting body.

6.6.4 Slippage of a fitting. Permanent movement of a fitting, measured when the hose is in a relaxed condition.

6.7 Conditions for use of level B preservation. When level B preservation is specified (see 5.1), this level of protection should be reserved for the acquisition of fittings and fitting assemblies for resupply worldwide under known favorable handling, transportation and storage conditions.

6.8 Quality conformance testing. It is recommended that the procuring activity waive sample testing on lots that contain fewer than 500 units of product when the contractor has tested and furnished a like item to the Government within the past year.

6.9 Classification changes. Changes in classification of the fittings between this revision of the specification and the previous edition are as follows:

MIL-F-52525C	MIL-F-52525D
Type A	Type 100R1
Type B	Type 100R2
Type C	Type 100R10
Type D	Deleted
Type E	Deleted
None	Type 100RE
None	Type 100R12

6.10 Subject term (key word) listing.

Fittings, Field Attachable
Fittings, Hydraulic
Fittings, Reusable
Fittings, Split Flange

6.11 Changes from previous issue. Astericks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue do to the extensiveness of the changes.

Custodian:
Army - ME

Review activities:
Army - GL
DLA - CS

User activities:
Army -AR
Air Force - 99

Preparing activity:
Army - ME

Project 4730-0500

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-F-52525D	Fittings, Wire Reinforced Hydraulic Hose and Clamp-Halves, General Specification For

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR ☐ USER ☐ MANUFACTURER ☐ OTHER *(Specify)*: _____
b. ADDRESS *(Street, City, State, ZIP Code)*	

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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